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RESEARCH PAPER:

Environmental geochemistry of lead and its impacts on groundwater pollution in East of Kurdistan, Iran

RAMIN SARIKANI, ARTIMES GHASSEMI DEHNAVI AND D. NAGARAJU

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See end of the article for authors' affiliations

Correspondence to :

D. NAGARAJU
Department of Studies in Geology, University of Mysore, Manasagangothri, MYSORE (KARNATAKA) INDIA

SUMMARY

Lead pollution is an environmental priority and contamination of the environment by lead is recognized throughout the world as one of the major environmental problems. The main objective of this paper was to present systematic data on this problem in East of Kurdistan, Iran. Geological activity and natural factors are a possible contamination source of groundwater and sediments that increased trace-element (Pb) concentrations in East of Kurdistan. Geochemical analyses of groundwater and sediment samples indicated high levels in near alteration rocks.

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Heavy metals are natural components of the earth's crust. They cannot be degraded or destroyed. To a small extent, they enter our bodies via food, drinking water and air (Chi-Man and Jiao, 2006). As trace elements, some heavy metals (copper, selenium, zinc) are essential to maintain the metabolism of the human body. However, at higher concentrations, they can lead to poisoning. Heavy metal poisoning could result, for instance, from drinking water contamination (*e.g.* lead pipes), high ambient air concentrations near emission sources, or intake via the food chain. Heavy metals can enter a water supply by industrial and consumer waste, or even from acidic rain breaking down soils and releasing heavy metals into streams, lakes, rivers and groundwater. Lead is one of the most dangerous inorganic contaminants owing to its high toxicity to living organisms (Nriagu and Pacyna, 1988). In some regions mining activity represents or represented an important source of Pb to the environment. The occurrence of high concentration of lead (Pb), one of the most hazardous chemical elements in drinking water has been recognized, over the past two or three decades, as a great public health concern in several parts of the world (Franco *et al*. 2009, Guy Merciera *et al.*, 2002) Although surface water is still used as drinking water in some areas, groundwater from tube-wells, which is considered relatively free of pathogens, is one of the main sources of drinking water in east of Iran, especially in rural areas. Lead can enter the human body in several ways, including through air, food and water; of these water is generally the most common medium of entry. In this area groundwater and sediment pollution occurs naturally. The toxic metal lead, for instance, is commonly found in the sediments or rock of the eastern Kurdistan, and can be present in groundwater at concentrations that exceed safe levels for drinking water. (Harrison *et al.*, 1981; Fergusson, 1985).

MATERIALS AND METHODS

Study area:

The studied area is located in between Hamadan and Kurdistan province, Iran and is 35^0 00' to 35^0 30' N, and 47^0 20' to 48^0 10' E. This region is 400 square km^2, and is bordered of Bijar from North, on Qorveh town from South, on Hamadan from East. (Fig.1).